



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/613,809	07/03/2003	Rick C. Stevens	5744EA-00252	6824
44341	7590	12/14/2005	EXAMINER	
JACOBSON & JOHNSON ONE WEST WATER STREET, SUITE 285 ST. PAUL, MN 55107			STAHL, MICHAEL J	
			ART UNIT	PAPER NUMBER
			2874	

DATE MAILED: 12/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.		Applicant(s)	
	10/613,809		STEVENS, RICK C.	
	Examiner		Art Unit	
	Mike Stahl		2874	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 November 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6, 10-18 and 20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 10-12, 15-18 and 20 is/are rejected.
- 7) ☒ Claim(s) 3-6, 13 and 14 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on November 7, 2005 has been entered. Claims 1-6, 10-18, and 20 are pending.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-2, 10, and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by Bhalla (US 6188814, cited in a previous action).

Claim 1: Bhalla discloses a post packaging alignable optical coupling (figs. 1-2) comprising: a base **13**; a first optical element **29** for receiving or transmitting an optical signal, the first optical element located in a fixed condition on the base; a second optical element (the collimating lens in front of any fiber of bundle **19**; col. 2 lns. 48-50) for receiving or transmitting an optical signal; a mirror **31** interposed to directly intercept an optical signal from one or the other of the optical elements, the mirror moveably disposed with respect to the base; and a MEMS actuator (col. 2 lns. 37-39), the actuator supporting the mirror to enable repositioning the

Art Unit: 2874

mirror 31 to direct the optical signal directly intercepted by mirror 31 from the first optical element into alignment with the second optical element or vice versa; and a shroud (made up of flange 17 and chip 15) encompassing the optical elements with a free space located the optical elements to therein enable remotely repositioning the mirror with the MEMS actuator when the shroud extends over the optical elements.

Claim 2: The second optical element 29 is fixedly mounted to the base 13 (col. 2 lns. 29-31).

Claim 10: The process of making the Bhalla device includes the steps of claim 10.

Claim 12: The Bhalla device includes multiple sets of first and second (or third and fourth) optical elements and associated respective repositionable mirrors.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-2, 10, 12, 15-18, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al. (US 6580858, cited in a previous action).

Claim 1: Chen discloses a post packaging alignable optical coupling (fig. 5) comprising: a base 101; a first optical element 132 for receiving or transmitting an optical signal, the first optical element located in a fixed condition on the base; a second optical element 134 for receiving or transmitting an optical signal; a mirror 133 interposed to directly intercept an optical

Art Unit: 2874

signal from one or the other of the optical elements, the mirror moveably disposed with respect to the base; and a MEMS actuator 140, the actuator supporting the mirror to enable repositioning the mirror 133 to direct the optical signal directly intercepted by mirror 133 from the first optical element into alignment with the second optical element or vice versa.

Chen does not expressly disclose a shroud which encompasses the optical elements. Shrouds for integrated optical devices are well known in the art. It would have been obvious to a skilled person at the time the invention was made to have provided the Chen module with a shroud since this would prevent undesirable contamination of the optical surfaces. The mirror may be remotely repositioned with the MEMS actuator when the shroud extends over the optical elements.

Claim 2: The second optical element 134 is fixedly mounted to the base (col. 4 lns. 24-27).

Claim 10: The process of making the Chen module including the proposed modification (addition of a shroud) would have met the limitations of claim 10.

Claim 12: The Chen module couples a single fiber 10 to a single device 135, but Chen does not disclose an embodiment wherein multiple fibers are coupled to multiple respective devices via multiple respective repositionable mirrors. However, it has been held that duplication of parts is not patentably significant unless an unexpected result is produced (In re Harza, 274 F.2d 669, 124 USPQ 378 (CCPA 1960)). In the present case, it would have been obvious to a skilled person to have constructed the Chen module with at least an additional fiber, an additional device, and an additional train of coupling mirrors, in order to provide the module with a higher signal handling capacity and/or to provide for bidirectional communication. This

Art Unit: 2874

additional mirror train would have included a third optical element 132, a fourth optical element 134, and a further repositionable mirror 133 coupling the third and fourth optical elements together.

Claim 15: A MEMS actuator 140 is mounted to the base and to the mirror 133 to enable remote positioning of the mirror to thereby bring an optical signal from the first optical element into alignment with the second optical element or vice versa.

Claims 16-18: The limitations of these claims are met by the Chen module described above, noting that the mirror 133 has a reflecting surface larger than an optical port (i.e. the optical port constituted by the core of fiber 10 or the aperture of device 135). It is further noted that the second element 134 has an optical port for receiving or transmitting an optical signal, and that lines 9-10 refer to “an optical port” rather than “said optical port”. Thus the recited limitation on the size of the reflecting surface is not strictly compared to the optical port of the second element as presently written.

Claim 20: Chen does not refer to shipping. It would have been obvious to a skilled person to have constructed and packaged for shipment the basic module of fig. 5, and to have shipped the module without first aligning the optical elements, since this would have saved a processing step at the factory (e.g. the alignment procedure could be outsourced or finalized by an end user of the module), and since it would have avoided any problems with de-alignment of the elements due to forces experienced during shipping.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bhalla (cited above).

Bhalla does not specifically disclose that the mirrors **31** tilt and rotate, but merely states that they may be of known type (col. 2 lns. 36-39). Two-axis MEMS mirrors were well known in the art at the time the invention was made. It would have been obvious to a skilled person to have used two-axis MEMS mirrors in the array **15** since this would enable higher connectivity within the switch. For example, two-axis mirrors would let any fiber of bundle **19** be connected with any other fiber, instead of just those fibers within the same row (or column).

Response to Arguments

The arguments related to the rejections of independent claims 1, 10, and 16 under Chen et al. in the last Office action are persuasive to the extent that the previous interpretation of various optical elements in Chen no longer satisfies the conditions of the independent claims as amended. However, the arguments are moot in view of the new interpretation of the optical elements that has been applied in the present action.

Claim 11 has not been rejected under Chen in this action because in the new interpretation of the Chen reference, there appears to be no need to provide the mirror **133** with tilt and rotation capability. The arguments appear to stress that tilting and rotating are distinct motions. This is understandable in the context of figures 5 and 6 of this application. However, a typical two-axis MEMS mirror in the prior art is fairly regarded as tilting about one axis and rotating about the other. It appears that claim 11 could be clarified by further reciting, for

example, that the tilting motion moves the mirror in an altitude direction and the rotating motion moves the mirror in an azimuth direction.

The argument regarding claim 12 is considered moot in view of the new interpretation of Chen in this action.

Allowable Subject Matter

Claims 3-6 and 13-14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 3 and 13 require that one of the optical elements is an optical fiber or an optical conductor, respectively. Neither of the presently applied references shows an optical fiber or conductor being directly coupled to a movable mirror. In Chen light from the fiber 10 initially strikes a reflective groove end surface 113 which is not movable. In Bhalla there is a collimating lens between each fiber of bundle 19 and an associated movable mirror 31 so that the coupling between the fiber and the movable mirror is not direct as base claims 1 and 10 require. There is no clear motivation or suggestion to modify either reference to comply with all the limitations of claims 3 or 13. Claims 4-6 and 14 are allowable by dependence from claims 3 and 13 respectively.

Conclusion

Inquiries about this letter should be directed to Mike Stahl at 571-272-2360. Inquiries of a general or clerical nature (e.g., a request for a missing form or paper, etc.) should be directed to

Art Unit: 2874

the technical support staff supervisor at 571-272-1626. Official correspondence which is eligible for submission by facsimile and which pertains to this application may be faxed to 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Questions about the Private PAIR system should be directed to the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Mike Stahl MSS
Patent Examiner
Art Unit 2874


AKM ENAYET ULLAH
PRIMARY EXAMINER

December 9, 2005